Meade® 4", 5", 6", and 7" *ED* Apochromatic Refractors

Exquisite optical imaging combined with advanced, computer-capable German-type equatorial mounts.

It has long been known that the refracting telescope is capable of yielding perhaps the finest optical imaging performance of any telescope design. Because, however, light passes *through* the lens elements of a refractor (as opposed, for example, to the design of the Newtonian reflecting telescope, where light is *reflected* by two mirrors), chromatic aberration has traditionally had a significant, negative effect on optical performance.

A spectacular prominence rises 90,000 km (56,000 miles) above the Sun's photosphere, driven along magnetic lines to form an enormous arc. This hydrogen-alpha image was captured by Jack Newton using a Coronado H-α filter attached to Mr. Newton's Meade 7" *ED* Apochromatic Refractor. The 0.04-sec. exposure was imaged with a Meade Pictor 1616XTE CCD camera.

Important Note: Observing or imaging the Sun carries inherent and potentially serious risks to the eye (including the risk of permanent eye damage), as well as risks to the telescope itself. Solar observing should be undertaken only by those who have received detailed instruction from professionals in the field as to the nature of these risks and as to proper and safe solar observing procedure.

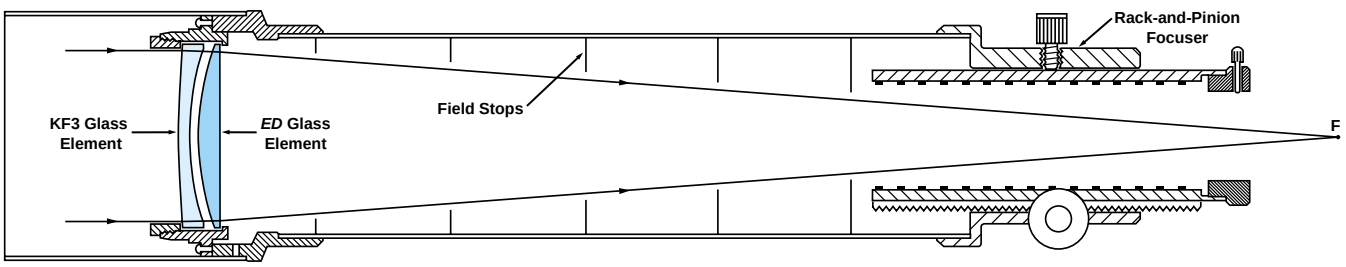
The problem of chromatic aberration, or color correction, was greatly reduced in the 1800's by the development of the improved crown and flint glasses that were used in 2-element achromatic lenses. Later, more exotic 3-element objective lenses were developed, and the use of calcium fluoride crystal, fluorite, in objectives of 60mm to about 100mm diameters became increasingly popular, owing to the higher and higher levels of color correction that these designs enabled.

It was not until the early-1980's, however, with the advent of *ED* (Extra-low Dispersion) glass, that truly first-rate apochromatic objective lens designs became physically realizable in moderate apertures and at reasonable pricing levels. More than three hundred years after the invention of the refracting telescope, it was the development of *ED* glass, more than any other advance, that finally allowed the basic refracting telescope design to reach fruition.

Meade *ED* Apochromatic Objective Lenses: The objective lenses included with Meade *ED* apochromatic refractors are made at the Meade Irvine facility and utilize the highest-grade optical glasses available; they are free of striae and other imperfections that can degrade optical performance. Each lens is individually manufactured, pitch-polished, and hand-figured by a master optician to reach diffraction-limited optical performance. Prior to being mounted in its machined cell, every lens is tested on a double-pass laser autocollimator an average of more than a dozen times at various stages of the production process.

The Result: Simply put, if you're looking for the finest, textbook-perfect, ultra high resolution, high-contrast images of the skies that astronomical instrumentation—of any type—can provide, then a Meade apochromatic refractor is

Facing page: **The Orion Nebula (M42).** A composite 60-minute exposure by Jason Ware with the Meade Model 152ED 6" *ED* Apochromatic Refractor on Fuji HG400 film.



In the Meade *ED* Apochromatic design, light enters from the left, passes through the hard KF3 (light blue) glass element of the objective lens, then through the *ED* (darker blue) glass element and focuses at F. The *ED* glass element permits the optical designer, by a precisely-computed combination of lens surface radii and air-spacing distance between the elements, to bring all visible wavelengths (colors) of light to virtually the same focus. Field stops located at intervals along the inside diameter of the main optical tube effectively block stray, off-axis light rays from reaching the focal plane.

for you. Dollar for dollar, the apochromats do not have the light grasp of a Newtonian reflector, nor do they have the versatility and excellent portability-for-aperture of the Schmidt-Cassegrain. What they do have is a level of optical imaging performance difficult to achieve with any other telescope design: observe minor lunar rilles and fault lines invisible in many telescopes and subtle color variations in Jupiter's belt structure, resolve double stars to the theoretical limit with a clearly-defined black space in between, view deep-space against the darkest of black-sky backdrops. These are some of the rewards of observing with a Meade *ED* apochromat.

"The color correction and optics of my Meade 6" ED/APO are superb—the highest levels of definition, contrast, and resolution of any telescope near its aperture range that I have used in 44 years of observing. The Moon is awesome, incredibly detailed, with features taking on almost a 3-dimensional appearance. In good seeing the belts of Jupiter resolve into fine, delicate features; colors of the belts are faithful, dramatic, and easy to observe. Sketching the finer features of Jupiter's surface is a pleasure with this first-class instrument. When Saturn's rings are opened up, minor ring divisions are well-defined. The colors of Mars are beautiful and faithful, with good detail visible when the planet is favorably placed; many clouds are easily followed, and the polar caps are well-defined. On March 4, 1995, I discovered a new rift in the north polar cap of Mars with the Meade 6". Deep-space objects are viewed in high contrast. The telescope passes all test double stars easily. The LXD 750 equatorial mounting is excellent, extremely rigid and smooth; the computer drive puts objects in the center of the field. I can't praise the telescope enough. A magnificent instrument." **— Phillip W. Budine, Past Executive Director and Jupiter Recorder, Association of Lunar and Planetary Observers.**

#684 Giant Rack-and-Pinion Focuser: Included with every Meade apochromatic refractor is the precision Meade #684 professional-quality focusing mechanism with helical-cut rack. The #684 focusing unit includes a basic eyepiece-holder accepting 2" O.D. eyepieces, with adapter for 1.25" eyepieces. The focusing sleeve is a large 2.7" inside diameter, accepting either 35mm or large-format 2.25" x 2.25" or 6cm x 7cm camera bodies.

Meade LXD 650 and LXD 750 Equatorial Mounts: Manufactured at the Meade Irvine factory, Meade LXD 650 and LXD 750 German-type equatorial mountings have revolutionized forever the way amateur astronomers think about telescope mounting platforms. The 650 and 750

A word about some of the astrophotographs in this catalog: Over the past ten years Texas amateur Jason Ware has provided us with a steady stream of high-quality photographs taken through his Meade 8" Schmidt-Cassegrain, 6" *ED* Apochromatic Refractor, 16" LX200 Schmidt-Cassegrain, and, most recently, his 12" f/2.2 Schmidt Camera. Many of Mr. Ware's photos have been published in leading astronomical magazines throughout the world, and examples of his work appear in this catalog *(see, for example, pp. 52, 61, and other captioned photos).* In response to increasing demand for reproductions of his astrophotos, Mr. Ware has made available at reasonable cost a series of fine 8" x 10", 16" x 20", and 32" x 40" color prints of astronomical objects taken through Meade telescopes. For further information write: *Jason Ware, Galaxy Photography, P.O. Box 835554, Richardson, TX 75083.* Mr. Ware's website may be accessed at **www.galaxyphoto.com**.

Meade Model 102ED 4" *ED* Apochromatic Refractor as seen from the east side of the equatorial mount, with the RA and Dec. manual slow-motion controls, azimuth control, and elevation lock visible.

The Andromeda Galaxy (M31). A composite of 45-minute and 90-minute exposures by Jason Ware with the Meade Model 152ED 6" Apochromatic Refractor on hypered Fuji HG400 film. The two exposures were scanned, stacked, and processed to form the final image shown here.

mounts yield the rock-solid stability and low gear-backlash so essential to quality telescope performance, whether in visual, photographic, or CCD imaging applications. Consider these *standard-equipment* LXD 650 and 750 mount specifications:

Massive polar and declination castings with oversized thrust surfaces.

Eight sealed ball bearings (4 on each axis!) carry even heavy loads with supreme precision.

Micrometric azimuth and elevation controls permit precise polar alignment.

Superstable field tripods, including the Meade Giant Field Tripod supplied with 6" and 7" APO models.

Optional Motor Drive Systems: Two dual-axis, DC-servo-motor-controlled drive systems are available for the LXD 650 and LXD 750 mounts; both drive systems fully integrate to either mount, so that no motors or electronics are visible external to the mounts. Importantly, *note that the RA and Dec. DC servo motors are included and factory pre-mounted internally as standard equipment on every LXD 650 and LXD 750 mounting.* These motors become operational when one of the drive systems described below is installed.

#1697 Computer Drive System (CDS): The #1697 CDS includes a wide range of advanced features not generally available on other commercial telescopes:

Nine high-torque dual-axis drive speeds for photo-guiding corrections at 2x sidereal rate; image centering and microslewing in the main telescope at 32x sidereal rate; image centering in the viewfinder at 2°/sec.; and fast-slewing of the telescope across the skies at any speed from 3°/sec. to 8°/sec., in 1°/sec. increments. Use the keypad controller to switch speeds instantly as you move the telescope electronically with a pointing accuracy measured in arc-minutes.

64,359-Object Built-in Library: Enter any of 7840 NGC deep-space objects (galaxies, nebulae, and star clusters of all types), 5386 Index Catalog objects; 110 Messier objects, 351 stars (doubles, variables, polar alignment stars), or one of the 8 major planets from Mercury to Pluto, press GO TO, and the telescope automatically slews to the object.

High-Precision Pointing™ Capability: Analogous to the pointing capability of Meade LX200GPS Schmidt-Cassegrains *(p. 32),* the #1697 CDS includes the High-Precision Pointing menu option. Use the keypad controller to call up this option at any time, and the telescope will GO TO any object in the 64,359-object database (or to any input RA and Dec. coordinates) and center it in the field to a precision of within about one arc-minute.

Control panel display: A display that includes connectors for CCD autoguider/imagers*;* an RS-232 serial interface for personal computers; an optional electric focuser; and an illuminated reticle eyepiece; as well as a North-South switch for telescope operation anywhere in the world.

Quartz-locked sidereal-rate tracking: The telescope automatically reverts to sidereal-rate tracking whenever one of the speed-control keys is not being depressed.

Permanently programmable Smart Drive *(p. 24)* capable of reducing RA periodic drive errors to 5 arc secs. or less.

Digital readouts on both telescope axes, read from the handheld keypad Electronic Command Center.

GO TO capability: Enter the RA and Dec. of an object, press GO TO, and the telescope automatically slews on both axes at 8° per sec. to center the object in the field.

Keypad operation of virtually every telescope function, from tracking rates to the crossline brightness of an illuminated reticle eyepiece.

Polar alignment of the mount: Quick (less than two minutes) and precise, using the built-in polar alignment software.

The Apennine Mountains on the Moon. A CCD image by Giorgio Mengoli with the Meade Model 152ED 6" Apochromatic Refractor. The large crater at upper-left is Archimedes.

#1664 Electronic Drive System (EDS): For users not requiring the wide-ranging capabilities of the #1697 CDS, the #1664 system includes: two dual-axis drive speeds, 2x and 32x sidereal; permanently programmable (PPEC) Smart Drive; pushbutton hand controller with object tracking-rate control including quartz-locked sidereal rate; brightness control of an illuminated reticle eyepiece; electric focus control; and map light. The #1664 EDS power panel display includes connectors for CCD autoguider/imagers, electric focuser, and illuminated reticle eyepiece, as well as N-S switch for worldwide operation.

Optical Tube Assemblies and Equatorial Mountings: Meade ED/APO optical tube assemblies are available for separate purchase, for use as auxiliary instruments or for placement on mountings of other design and construction. LXD 650 and LXD 750 equatorial mountings are also available for separate purchase, for use with alternate tube assemblies.

"With some friends I recently put the Meade 4" Model 102ED through extensive testing. The telescope was virtually perfect. The mount was very solid and the computer drive made finding objects in light-polluted North York very easy.... The optics: all I can say is "superb." I could not believe the colour correction I was seeing: I detected no on-axis colour whatever. We took the scope up to 360X and the image did not degrade at all. The Meade 102ED is a remarkable telescope." **— Richard Anderson, Mississauga, Ontario, Canada.**

Meade Model 102ED: 4" f/9 *ED* Apochromatic Refractor. Shown with optional #1664 Electronic Drive System.

Observing with the 4" Model 102ED: The Meade 4" *ED* apochromat delivers professional-level optical performance in a highly portable package. Stellar images appear with textbook-quality diffraction patterns, both inside and outside of focus. The Moon is an incredibly stark, high-contrast field of mountain ranges, fault lines, clefts, and rilles. Jupiter shows a wealth of changing detail and subtle color shadings; Saturn's Cassini division and the shadow pattern of the rings on to the planet's disc are routinely visible. In deep-space objects appear almost three-dimensional against the extremely dark-sky backdrop afforded by the telescope's unobstructed optical system. Nebulosities, such as the Orion Nebula (M42), the Dumbbell Nebula (M27), the Trifid (M20), and the Lagoon (M8), stand out in splendid detail, with filamentary nebular structures observable even under less than optimal seeing conditions.

As remarkable as the telescope's optical system, the Model 102ED's standard equipment LXD 650 equatorial mounting provides the stability required for serious visual observing, astrophotography, or CCD imaging. Each telescope axis rides on four sealed ball bearings, assuring a precision of motion unattainable on lesser instruments. The optional #1697 Computer Drive System includes nine dual-axis drive speeds and locates and centers in the field over 64,000 objects, automatically.

Specifications: 4" Model 102ED—Includes 4" *ED* apochromatic refractor optical tube assembly with EMC super multi-coatings on both surfaces of the front lens element (D = 102mm, F = 920mm, f/9); #684 giant rack-and-pinion focusing mechanism with 2.7" I.D. drawtube, 2" eyepiece-holder, adapter for 1.25", and drawtube lock; 8 x 50mm viewfinder with removable dovetail bracket; dew shield; #930 2" diagonal mirror; Series 4000 Super Plössl 26mm (35X) eyepiece; LXD 650 equatorial mount with micrometric azimuth and elevation controls, and with worm gear manual slow-motion controls, setting circles, and locks in both RA and Dec.; retractable counterweight shaft and counterweight; latitude elevation scale; standard variable-height field tripod; operating instructions.

Specifications and Features: Meade *ED* Apochromatic Refracting Telescopes

TELESCOPE:	4" Model 102ED	5" Model 127ED	6" Model 152ED	7" Model 178ED
Optical Design	2-element *ED* Apochromat	2-element *ED* Apochromat	2-element *ED* Apochromat	2-element *ED* Apochromat
Diameter	110mm	135mm	160mm	188mm
Clear Aperture	102mm (4.0")	127mm (5.0")	152mm (6.0")	178mm (7.0")
Focal Length	920mm f/9	1140mm f/9	1370mm f/9	1600mm f/9
Resolving Power (arc secs.)	1.1	0.9	0.74	0.64
Super Multi-Coatings on Front Element	Standard, both sides	Standard, both sides	Standard, both sides	Standard, both sides
Near Focus *(approx.)*	50 ft.	75 ft.	100 ft	150 ft.
Limiting Visual Magnitude	12.0	12.8	13.5	13.8
Limiting Photographic Magnitude	14.5	15.3	16.0	16.3
Image Scale	1.56°/inch	1.26°/inch	1.05°/inch	0.90°/inch
Maximum Practical Visual Power	400X	500X	600X	700X
Actual Field with SWA 40mm Eyepiece	2.9°	2.35°	1.95°	1.67°
35mm Angular Film Coverage	1.48° x 2.11°	1.19° x 1.70°	0.99° x 1.41°	0.85°x 1.21°
Optical Tube Dimensions (dia. x length)	4.5" x 31.5"	5.5" x 40.75"	7" x 51"	8" x 59.5"
Dew Shield (dia. x length)	5.5" x 5.5"	7" x 7"	8.25" x 8.5"	9.8" x 10"
Focusing Mechanism	2.7" I.D.; 4" travel	2.7" I.D.; 4" travel	2.7" I.D.; 4" travel	2.7" I.D.; 4" travel
Eyepiece-Holder	2", with 1.25" adapter	2", with 1.25" adapter	2", with 1.25" adapter	2", with 1.25" adapter
Diagonal Mirror	2" #930	2" #930	2" #930	2" #930
Equatorial Mounting	LXD 650; German-type	LXD 650; German-type	LXD 750; German-type	LXD 750; German-type
Ball Bearings	8 x 2.25" dia.	8 x 2.25" dia.	8 x 3.1" dia.	8 x 3.1" dia.
Tripod	Standard Field Tripod	Standard Field Tripod	Giant Field Tripod	Giant Field Tripod
Tripod Legs	Inner leg: 1.5" O.D.; Outer leg: 2" O.D.	Inner leg: 1.5" O.D.; Outer leg: 2" O.D.	Inner leg: 2" O.D.; Outer leg: 3" O.D.	Inner leg: 2" O.D.; Outer leg: 3" O.D.
Tripod Height [Note 1]	30" - 44" variable	30" - 44" variable	40" - 50" variable	40" - 50" variable
Counterweight(s)	1 - 10 lb.	1 - 15 lb.	1 - 25 lb.	1 - 25 lb. & 1 - 12 lb.
Worm Gear Dias.	RA & Dec.: 2.8"	RA & Dec.: 2.8"	RA & Dec.: 3.75"	RA & Dec.: 3.75"
Setting Circles	RA: 4"; Dec.: 4.15"	RA: 4"; Dec.: 4.15"	RA: 4.75"; Dec.: 5"	RA: 4.75"; Dec.: 5"
Manual Slow-Motion Controls	RA and Dec.	RA and Dec.	RA and Dec.	RA and Dec.
Latitude Range	15° to 60°	15° to 60°	20° to 60°	20° to 60°
Optional Drive Systems *(see below)*	#1664 EDS or #1697 CDS	#1664 EDS or #1697 CDS	#1664 EDS or #1697 CDS	#1664 EDS or #1697 CDS
Materials				
Objective Lens	KF3; ED/FK01	KF3; ED/FK01	KF3; ED/FK01	KF3; ED/FK01
Optical Tube	aluminum	aluminum	aluminum	aluminum
Equatorial Mounting	aluminum castings	aluminum castings	aluminum castings	aluminum castings
Field Tripod	chromed steel	chromed steel	chromed steel	chromed steel
Total Net Telescope Weight (approx., with mount & tripod)	69 lbs.	78 lbs.	153 lbs.	176 lbs.
Heaviest Sub-Section for Field Assembly	23 lbs.	23 lbs.	55 lbs.	55 lbs.
Shipping Weight *(approx.)*	86 lbs.	96 lbs.	185 lbs.	212 lbs.

OPTIONAL DRIVE SYSTEMS:	#1664 Electronic Drive System (EDS)	#1697 Computer Drive System (CDS)
Drive Motors	2-speed microprocessor-controlled, 18v DC servo motors in RA and Dec. with Smart Drive software.	9-speed microprocessor-controlled, 18v DC servo motors in RA and Dec. with Smart Drive software.
Slew Speeds	2x, 32x sidereal	2x, 32x sidereal; 2°/sec. - 8°/sec., in 1°/sec. increments
Onboard Celestial Object Database	N/A	64,359 objects
Hand Controller	Microchip microcontroller; 2 x 8 bit A/D converters; 7 pushbuttons.	Motorola 68HC05 microcontroller; 2 line x 16 alphanumeric character display; 19 button keypad, red LED backlit.
Main Controller	Motorola 68HC05 microcontroller; 512 byte non-volatile memory (EEROM).	16MHz 68000 microprocessor; 128K program memory; 16K RAM; 512 byte non-volatile memory (EEROM)
Power Source [Note 2]	18 volts DC	18 volts DC

[1] The LXD 650 mount supplied with 4" and 5" APO models adds approx. 18" to the tripod heights listed; the LXD 750 mount supplied with 6" and 7" APO models adds approx. 24" to the tripod heights listed. [2] The #1664 EDS and #1697 CDS each include a 25 ft. power cord and adapter for operation from any standard 115v AC outlet. For field operation of either drive system from a 12v automobile cigarette lighter plug, the #1812 Electronic DC Adapter *(p. 75)* is available.

"I thought you would like to hear the results of tests on your 5" APO at the recent Canadian Starfest Convention…Saturn was terrific. Aside from the usual things such as the Cassini division, I could see the olivine cap on top of the ball, as well as subtle detail in the main equatorial belt. What really struck me as amazing was the true-to-life colour rendition the APO provided. ***The colour correction of the Meade 5" is as perfect as I've ever seen in a refractor.*** *I can wholeheartedly recommend the Meade 5" APO. In terms of comparison to other brands on the market, the Meade is superior."* **— Richard Anderson, Mississauga, Ontario, Canada.**

Meade Model 127ED: 5" f/9 *ED* Apochromatic Refractor. Shown with optional #1697 Computer Drive System.

"…The 127-millimeter objective…is made from modern ED glass. The result is virtually perfect color correction…the Meade 127ED refractor is a thoroughly modern telescope that retains the best of the past, including craftsmanship and sound mechanical design…its [optional] computerized drive system provides a host of well-conceived and useful features." **— from the review in *Sky & Telescope*, November, 1993.**

Observing with the 5" Model 127ED: Notwithstanding its 56% increase in light-collection area and image brightness, the Model 127ED carries only a modest increase in price compared to its sister scope, the Model 102ED. Perhaps the best trade-off among the competing factors of aperture, portability, and price, the 127ED presents breathtaking views of the entire range of astronomical subjects. Use the Series 4000 SWA 40mm eyepiece *(p. 94)* with its 2.35° field to view the most tenuous deep-space nebulae in radiant detail; observe planetary images you never thought possible with the UWA 14mm eyepiece; or use the SP6.4mm ocular at 178X to resolve binary stars to 0.9 arc seconds.

Specifications: 5" Model 127ED—Includes 5" *ED* apochromatic refractor optical tube assembly with EMC super multi-coatings on both surfaces of the front lens element (D = 127mm, F = 1140mm, f/9); #684 giant rack-and-pinion focusing mechanism with 2.7" I.D. drawtube, 2" eyepiece-holder, adapter for 1.25", and drawtube lock; 8 x 50mm viewfinder with removable dovetail bracket; dew shield; #930 2" diagonal mirror; Series 4000 Super Plössl 26mm (44X) eyepiece; LXD 650 equatorial mount with micrometric azimuth and elevation controls, and with worm gear manual slow-motion controls, setting circles, and locks in both RA and Dec.; retractable counterweight shaft and counterweight; latitude elevation scale; standard variable-height field tripod; operating instructions.

"I've been an amateur astronomer since 1959 and have observed through all manner of telescopes large and small, up to 40" aperture. I am writing to tell you that images through the Meade 6" ED/APO are absolutely stunning even by professional standards. Image contrast and definition are amazing. The quality and workmanship are flawless. Having joined the Association of Lunar and Planetary Observers in 1965, I can only speculate on how much additional and useful observing work could have been accomplished, had quality apochromatic refractors such as this been available those many years. The image quality even to the edge of the field is outstanding, while the color correction and contrast are simply better than any telescope I've ever used."

— Orville H. Brettman, Past President, The Astronomical League, Huntley, IL.

Meade Model 152ED: 6" f/9 *ED* Apochromatic Refractor. Shown with optional #1697 Computer Drive System.

Observing with the Meade 6" Model 152ED: Fortunate indeed is the observer with a Meade 6" *ED* apochromatic refractor at his or her disposal. With its 44% increase in light grasp and image brightness compared to the 5" model, and 125% increase compared to the 4" model, the 152ED is a professional-class instrument capable of serious research. Observe transits, and shadow transits, of Jupiter's Galilean satellites across the planet's disc, as well as structural detail and color variations within the Red Spot and at the boundaries of 8 to 10 cloud belts; resolve all three of Saturn's primary rings and substructures within the rings themselves. A wide range of photo-visual accessories *(pp. 74 - 75)* is available to suit virtually any observing requirement. For the dedicated amateur, or for the school or college observatory, there is no finer telescope available.

Specifications: 6" Model 152ED—Includes 6" *ED* apochromatic refractor optical tube assembly with EMC super multi-coatings on both surfaces of the front lens element (D = 152mm, F = 1370mm, f/9); manual slewing handles on the rear cell; #684 giant rack-and-pinion focusing mechanism with 2.7" I.D. drawtube, 2" eyepiece-holder, adapter for 1.25", and drawtube lock; 8 x 50mm viewfinder with removable dovetail bracket; dew shield; #930 2" diagonal mirror; Series 4000 Super Plössl 26mm (53X) eyepiece; LXD 750 equatorial mount with micrometric azimuth and elevation controls, and with worm gear manual slow-motion controls, settings circles, and locks in both both RA and Dec.; retractable counterweight shaft and counterweight; latitude elevation scale; giant variable-height field tripod; operating instructions.

Meade Model 178ED: 7" f/9 *ED* Apochromatic Refractor. Shown with optional #1697 Computer Drive System.

"The resolution and color correction of my Meade 7" ED/APO are of professional quality, and the computer-controlled LXD 750 equatorial mounting is a pleasure to use. The telescope is everything you say it is, and more."
— Rod Wheeler, Big Bear City, CA.

Observing with the Meade 7" Model 178ED: The Meade 178ED is one of the world's largest continuous-production apochromatic refractors. Armed with 38.5 sq. in. (249 sq. cm.) of precision, unobstructed light-collecting area, the 178ED shows many objects in sharp, high-definition detail that larger telescopes of other types often fail to show at all. A series of ten field stops, mounted continuously along the inside surface of the main optical tube and included with all Meade *ED* models, combines with advanced super-multi-coatings to yield extremely high-contrast images at the focal plane. And yet, even when equipped with the state-of-the-art Meade #1697 Computer Drive System, the telescope is within the budget of many advanced amateurs. Once you've experienced a Meade 178ED/APO, there can be little comfort in using a lesser instrument ever again.

Specifications: 7" Model 178ED—Includes 7" *ED* apochromatic refractor optical tube assembly with EMC super multi-coatings on both surfaces on the front lens element (D = 178mm, F = 1600mm, f/9); manual slewing handles on the rear cell; #684 giant rack-and-pinion focusing mechanism with 2.7" I.D. drawtube, 2" eyepiece-holder, adapter for 1.25", and drawtube lock; 8 x 50mm viewfinder with removable dovetail bracket; dew shield; #930 2" diagonal mirror; Series 4000 Super Plössl 26mm (62X) eyepiece; LXD 750 equatorial mount with micrometric azimuth and elevation controls, and with worm gear manual slow-motion controls, setting circles, and locks in both RA and Dec.; retractable counterweight shaft and counterweight; latitude elevation scale; giant variable-height field tripod, operating instructions.